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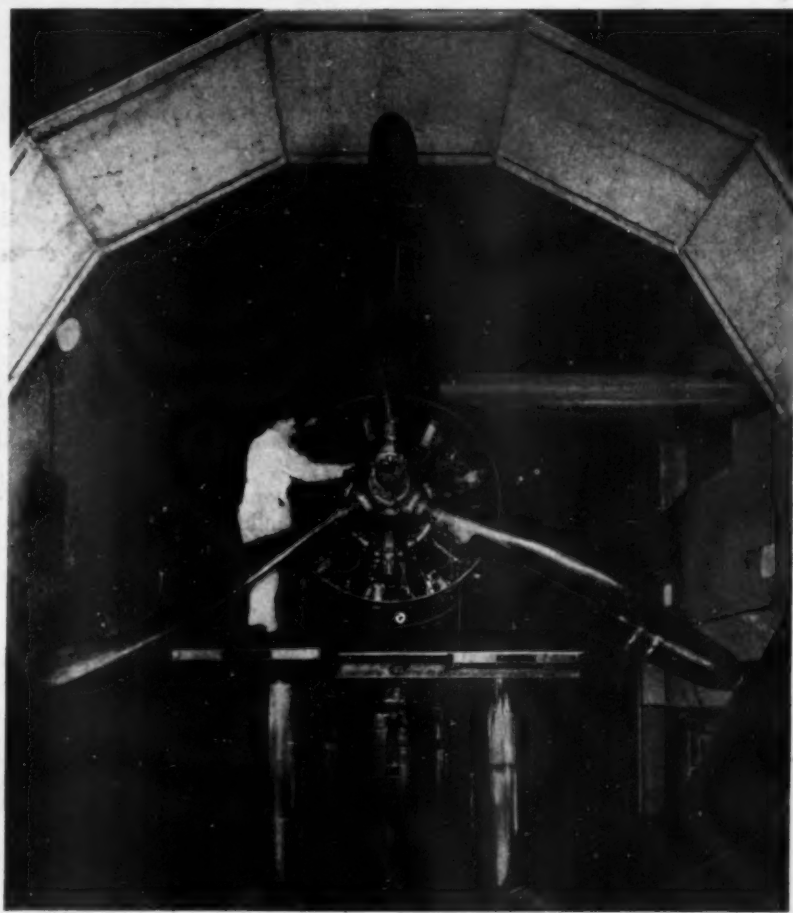
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JUL 21 1942

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



July 18, 1942

World's Biggest

See Page 43

A SCIENCE SERVICE PUBLICATION

## Do You Know?

Only 60% of all pigs survive until marketing time to become part of the nation's food supply.

Grass clippings allowed to fall back on the ground soon decompose and return valuable fertility to the soil.

Litters from sows deficient in vitamin A have a high percentage of pigs with harelips, cleft palates, and similar defects.

Approaching tea shortage in the U. S. may be eased by use of a South American herb, yerba maté, which makes a tea-like brew.

A dehydrating process being developed by the Department of Agriculture will convert cheese to a flour-like form which when mixed with water will resemble processed cheeses.

Expansion and contraction of the wood makes it impossible to fill permanently cracks between floor boards in old houses, but sawdust and shellac make a good temporary filler.

A student of surveying has invented a "pathfinder," a true magnetic bearing finder, which can be made from two cardboard circles, a hatpin, an adhesive tape holder, and a cork stopper.

Very acid soils produce poorly because of the low level of available calcium, magnesium, phosphorus and potassium, and because activity of microorganisms, such as the nitrogen-fixing bacteria, is depressed.

## Question Box

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Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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### RESOURCES

What bottleneck is broken by glass that floats? p. 44.

What use will be made of the drippings you save and turn in? p. 44.

### ZOOLOGY

What causes the natural "permanent wave" in muskrats? p. 41.

Shagreen, the dried skin of sharks, is used for polishing furniture.

Dry skim milk has all the food values of fresh milk except fat and vitamin A.

The 1942 tung oil crop in the United States is expected to be the largest in history.

One ounce of gold may be drawn into 1½ miles of wire.

The long white hairs of the old man cactus are really soft spines.

The average American soldier now weighs 152 pounds, while during the Civil War he weighed only 136 pounds.

## SCIENCE NEWS LETTER

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PUBLIC HEALTH

## D. C. Health Officer Institutes Special Measures

**"Immunological Inventory" Will Be Conducted to Find Whether New Arrivals Are Vaccinated, Inoculated**

**S**PECIAL measures to fight epidemics and keep the nation's fast-growing Capital healthy during war have been instituted by Dr. George C. Ruhland, District of Columbia Health Officer.

A door-to-door health census of all new arrivals will be made as soon as the necessary staff can be recruited. Object of this health census, which Dr. Ruhland calls an "immunological inventory," is to determine whether the new arrivals have been vaccinated against smallpox and given inoculations against typhoid fever and whether their children have had toxoid to protect them against diphtheria. Those who have not had these health-protective measures will be urged to get them at once.

The city has remained healthy and free from epidemics so far. Air raid destruction of water supply and sewage disposal systems, however, is seen as a possible source of great, if temporary, danger. Because of this possibility, the District of Columbia Medical Society, acting on Dr. Ruhland's instigation, has warned everyone in the National Capital to be immunized against typhoid fever. The entire staff of several departments of the District of Columbia Government and key persons in national Government departments have already been immunized against typhoid fever.

The District of Columbia health department, with the U. S. Public Health Service, is conducting a survey of mosquitoes in Washington and the vicinity. One variety of mosquito that can carry malaria has been found in nearby Oxon Run, Md. With the increase in air travel between Washington and the South has come increased danger that malaria-infected passengers or mosquitoes might introduce the disease to this city. First step in fighting this possible danger is the survey to determine the number and location of any mosquitoes capable of carrying the malaria parasites, following which, breeding places will be treated with oil or cleared.

The new budget for the local health department has allowed Dr. Ruhland

to increase greatly his staff of sanitary inspectors. The new positions are largely being filled with women who, Dr. Ruhland thinks, are better fitted for the job of inspecting boarding and rooming houses to see that they meet health department sanitary requirements.

Outstanding triumph in Dr. Ruhland's efforts to control venereal diseases has been the Police Court conviction and sentence, for the first time in D. C., of a

prostitute for failure to take the treatment that would prevent her spreading venereal disease. The health department's policy in this connection, Dr. Ruhland emphasized, is not to be known as a police agency. It is interested only in keeping out of circulation those who can spread disease.

The health department has been able to maintain the purity of both the water and milk supplies, in spite of the tremendous growth of the population and consequently increased demand. Because nearby Army camps are diverting thousands of gallons of milk daily from the Washington supply, Dr. Ruhland has had to allow local dairies to make up the deficit for residents by importing milk from inspected sources in Pennsylvania which are normally outside the Washington milk shed.

*Science News Letter, July 18, 1942*

PHYSIOLOGY

## Hypnotically Drugged Troops May Be Next Development

**H**YPNOTICALLY drugged troops may be the next development in military strategy, it is hinted in medical publications in London just received in the United States.

"If a drug could be found that would facilitate the association of ideas and thereby increase initiative without impairing judgment, abolish fatigue and the desire for sleep for about 48 hours, and yet produce no harmful effects such as incoordination that might impair accuracy in shooting, the discovery would go far towards completing the revolution that we are seeing in military strategy," declares the editor of the *Lancet*.

"In war a reduction in fear, if it can be attained without too great a sacrifice of mental efficiency, is often as useful as intellectual stimulation," he continues, calling attention to a report in the same issue of the *Lancet* of investigations on sodium amytal.

This drug is familiar to many as a sleeping medicine. Its ability to banish apprehension and calm the mind is well known to patients who have been given it before being wheeled to the operating room. Doctors call it a hypnotic drug. It was used successfully to calm anxious patients during air raids on London.

Intelligence tests on nearly 400 men showed that in doses of one to three

grains it "produces relative mental calm for some four hours without, apparently, more than slight impairment of mental powers." The impairment was a drop of three or four points in I.Q. which the investigators state "does not represent an appreciable decline in mental efficiency."

The tests were reported from an Emergency Medical Service Neurological Unit by Dr. Patrick Slater, statistical psychologist to the War Office, Dr. William Sargent, psychiatric specialist to the EMS, and Miss Margaret Glen, technical assistant.

The Germans are reported to have used various pep pills as mental stimulants for their shock troops, among them amphetamine sulfate, also called benzedrine sulfate and a newer drug, known as Pervitin in Germany and as Methedrine in England. These have both been disappointing, it appears from the *Lancet* editor's comments. Amphetamine was not sufficiently powerful as a brain stimulant for soldiers, he says, besides having other disadvantages.

Pervitin has similar unpleasant effects and experiments suggest that it is too stimulating. It speeds up association of ideas faster than the executive part of the brain can cope with the new ideas.

*Science News Letter, July 18, 1942*



## METALLURGY

# Pilot Plants To Test Methods Of Producing Sponge Iron

Experiments of U. S. Bureau of Mines Indicate That It May Be Produced Directly From Ore by Natural Gas

**T**WO PILOT plants of 30 to 50 tons daily capacity are planned by the Bureau of Mines to test on a semi-commercial scale the production of sponge iron, Dr. R. R. Sayers, Director of the Bureau, has announced. Operation of these plants as well as direction of the research work will be under the supervision of Dr. R. S. Dean, assistant director of the bureau.

Past experiments of the Bureau of Mines dating back to 1927 and of others have shown the feasibility of producing sponge iron directly from the ore by the use of natural gas or of non-coking coal, cheapest of fuels. Smaller and less expensive furnaces can be used because the ore is not melted as it is in the blast furnace which produces pig iron. They could utilize small deposits of ore,

deposits too small to supply a modern blast furnace.

Such plants would not displace existing industry, Dr. Sayers stated, but would supplement it by providing low-carbon iron in place of vanishing scrap to make steel for guns, tanks, ships and other war material. Ordinarily, pig iron and scrap are mixed to make steel.

Sponge iron can be produced from the ore by hot reducing gases obtained from natural gas or from coal by a "reforming" process. These gases contain carbon monoxide, deadly gas of the automobile exhaust, or hydrogen. The carbon monoxide combines with the oxygen in the ore, leaving metallic iron which collects as a spongy mass at the bottom of the furnace.

These two processes, the one using natural gas, the other coal, will be the first to be tried out on a semi-commercial scale in the Bureau's pilot plants. But other processes will be investigated also.

A side-line use for the reducing gases would be the making of high-purity soft iron free from carbon by the reduction of highly pure iron oxide. There is a high demand for this material by electrical manufacturers, particularly for magnet cores and armatures. Much of it was formerly imported from Sweden.

When the processes are proven, Dr. Sayers stated, and the Bureau's equipment developed to a commercial scale, the scrap situation in this country would be alleviated a few months thereafter.

This so-called sponge iron process is the first by which man smelted iron from its ores. The ore was intimately mixed with charcoal in a small furnace or even on a forge. Air was blown in by a bellows. The temperature reached, 1,400 to 1,500 degrees Fahrenheit, was not sufficient to melt the iron, which gathered in a spongy or powdery mass at the bottom of the furnace. These characters were due to about 50% slag. This was afterwards hammered out of the metal, which was called wrought iron. There was also much loss due to oxidation. Some improvement was made by adding a limestone flux.

All the iron and mild steel produced in ancient and medieval time up to the middle of the 14th century was produced in this way. Then the blast furnace was invented. This was nothing but a bigger furnace with a better blast operated by water power. About 1612 a further improvement was made by substituting coke for charcoal, motivated at first by the fact that England was being denuded of her forests by the voracious iron furnaces.

In the blast furnace a temperature of 2,700 degrees Fahrenheit or more is reached. This melts the iron, and the product is cast iron.

Long after the introduction of the blast furnace, however, wrought iron was still preferred to cast iron. Nowadays it does not matter what way we get our iron, for metallurgists have learned to change its character.

*Science News Letter, July 18, 1942*

## IN THE SCRAP

*What happens to the old tires and over-shoes you turned in to the Government is told in this story in pictures from the B. F. Goodrich Co. At the left is shown the mountains of miscellaneous scrap as sent for reclaiming. Old tires are ground up (right) and then placed in a de-vulcanizer where caustics eat the cotton from the rubber.*



## INVENTION

# Rifle Bullets That Flash Help Marksman Correct Aim

Patent Enables Riflemen or Machine-Gunners to Have Advantage Now Exclusive with the Artillerymen

**R**IFLEMEN or machine-gunners in future will have an advantage now possessed only by artillerymen, who can tell where their shells fall by watching the flash or smoke of the explosion, and thus correct their aim. This improvement in small-arms fire control is expected to result from a new-type bullet on which U. S. patent 2,288,627 has just been issued to Frank Kowalski, Jr., now on service in the Army.

Small-arms bullets, the inventor points out, register their fall only when they drop on dusty ground or a relatively flat water surface. He undertakes to remedy the situation by providing hollow bullets, with metal very thin near the point, containing a smoke-making compound for daytime use, or an incendiary mixture that will make a flash at night. He states that in actual tests on the range these bullets have shown up well.

Rights in the patent are assigned to the government, without royalty payment to the inventor.

*Science News Letter, July 18, 1942*

## "Squeeze-Down" Bullet

**A**NOTHER bullet is included among the week's crop of 742 patents. It is the invention of a German, Waldemar

Born of Stuttgart, but application for the patent (No. 2,288,604) was made over a year ago, before this country became involved in the war. Herr Born's invention belongs to the class sometimes called "squeeze-down" bullets, which are intended for firing through rifle bores that diminish in caliber towards the muzzle, to secure greater powder pressure and hence higher velocity.

Around a rifle bullet of conventional type, having a little less than the caliber of the bore at the muzzle, there is a second envelope of metal, with one or more hollow bulges around its middle, of the caliber of the bore at the breech. This takes the rifling and spins the bullet, and at the same time is squeezed down to the muzzle caliber as it progresses through the bore.

*Science News Letter, July 18, 1942*

## Better Gun-Casting Mold

**A**NOTHER invention of warlike purpose is offered by W. G. Donald of Philadelphia (also now in Army service) and J. L. Martin of Lowell, Mass., for government use without royalty. It is a mold for casting field guns, belonging to the category known as centrifugal casting molds. The mold, hung vertically, is spun rapidly after being filled with

molten steel. This sets up a centrifugal force, which causes the densest and strongest part of the metal to form on the outside. The present invention improves this mold by making its suspending flanges just a trifle less than a tight fit in the suspending rotor, to allow for expansion when it is hot, and thereby to prevent the "freezing" of the mold in the rotor. The patent is No. 2,288,614.

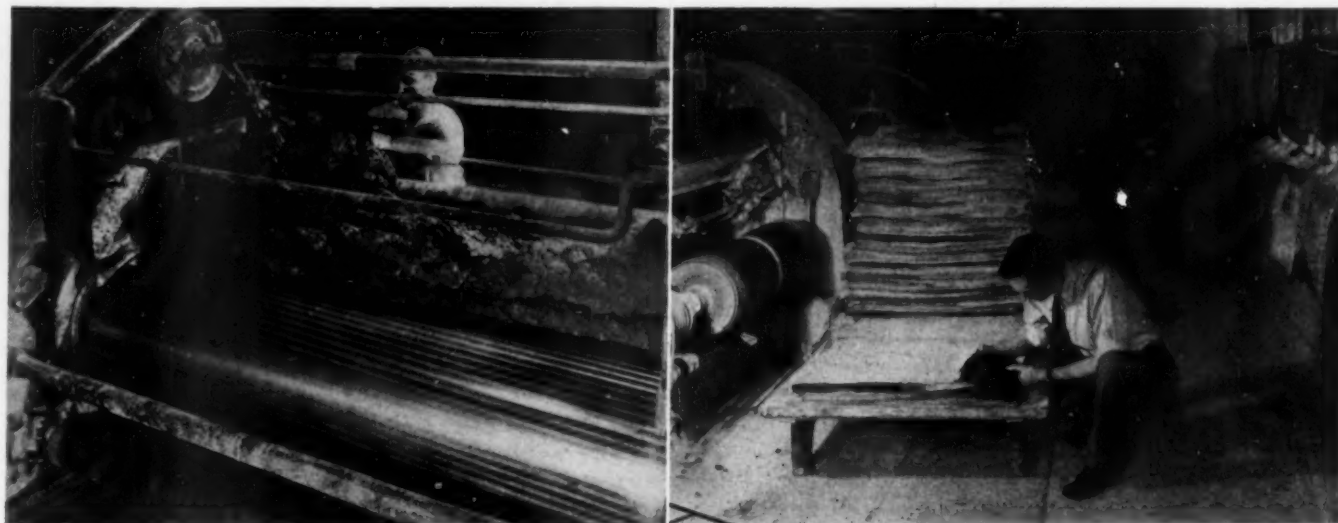
*Science News Letter, July 18, 1942*

## Television for Pilots

**T**ELEVISION comes to the aid of the airplane pilot who cannot see what is ahead of him or the ground because of obscuring fog or haze. Use is made of infra-red or long-wave light rays which, as is well known, will get through where ordinary light will not. This light is just as invisible to the human eye as ultraviolet or short-wave light. Photographs can be made by means of it; this is frequently done by reconnaissance planes. But the pilot lost in thick weather has no time to develop a picture. In the invention of Harold A. Adams of Bakersfield, Calif., the infra-red image is formed in a television transmitter and sent by wire, instead of through the air, to the receiver on the instrument board. Thus the invisible infra-red image is converted instantly into a visible image in which all movements can also be

## RE-USE FOR WAR

Reclaimed rubber is thoroughly mixed or kneaded under pressure on steam-heated mill rolls (left). Final step is shown (right) in this view of a skid load of slabs of reclaim taken from the refiner. It is now ready to be made into articles of war.



seen. The camera may be located under the fuselage or in some other convenient place, with means to turn it in any direction in which the aviator may wish to "look." Mr. Adams' invention is covered by patent 2,288,871.

*Science News Letter, July 18, 1942*

## Chemicals from Garbage

**T**HE PRESENT national drive to get value out of all manner of scrap and waste materials might be aided by a garbage-reducing system on which patent 2,288,757 was issued to R. J. Thompson of Michigan City, Ind. In it the garbage is first ground fine, then digested by bacteria. The end-products of this fermentation, principally gaseous, are treated with sulfuric and nitric acids. Mr. Thompson states that his process recovers nitrates for explosives and fertilizers, also useful dyestuffs and other chemicals. He further claims that the apparatus is kept so completely gas-tight that the process is completely odorless.

*Science News Letter, July 18, 1942*

## MILITARY SCIENCE

### Wire-Dangling Rocket Not a New Weapon

**B**RTAIN's newest anti-aircraft weapon, a rocket that trails long tentacles of entangling wires, is no new thing under the sun. Its essential idea was proposed during the first World War by Prof. R. W. Wood, noted Johns Hopkins University physicist, who was then overseas in war service. His idea was to have the wires spun out of an anti-aircraft shell. Ordnance men were interested in what they termed the "spaghetti shell," but the war ended before it could be developed to the field-test stage.

Since 1918 the general idea has persisted, and a number of inventors have had a go at it. Shells, rockets, balloons and airplanes have been among the means proposed for getting the menacing steel tentacles into the air. It has also been proposed to string small bombs at intervals on the wires, to act like miniature mines when the aircraft struck them or pulled them into contact by winding up the wire on its propeller.

A Swiss inventor, Erich Bickel of Baden, has been especially active in this field. He holds several U. S. patents, two of them issued in January and February of this year.

*Science News Letter, July 18, 1942*

## INVENTION

# Ideas From Talent Search Winners Given to Government

## Ten Suggestions from Nine of the Forty Who Won Trips to Washington Forwarded to Inventors Council

**I**DEAS as to how science can help win the war received from boys and girls just graduated from high schools throughout the nation are being forwarded to the National Inventors Council by Science Service as a result of the first annual Science Talent Search conducted by Science Clubs of America.

Ten inventive suggestions are being sent to the government from nine among the 40 winners of the Science Talent Search.

All the suggestions deal with specific ways in which scientific methods and principles can aid the fighting forces of the United Nations.

An electronically controlled bomb sight is suggested by Paul Joseph Barthel, aged 18, from the Reitz Memorial High School, Evansville, Ind.

Buoys equipped with listening devices and radio apparatus would detect the sound of a submarine's engines and send out a warning, according to the plan of William Dorrance Worthington, 17, from Camden High School, Camden, N. Y.

Robert Edward Phillips, 18, of Herbert Hoover High School, Glendale,

California, would use the sound of a boat's engines to explode mines, while his school-mate, William Denman Calhoun, aged 16, has detailed plans for a rocket bomb.

An incendiary bomb using the principle of the "oxygen lance" was designed by Wolf Karo, 18, from Utica Free Academy, Utica, N. Y. Homer Frederick Davis, 18, of the Frewsburg, N. Y. High School, has submitted the design of an internal combustion engine different from those in general use, and Robert Greiff, 16, of the Brooklyn, N. Y., Technical High School, plans to run machine shops by photo-electric cells.

Making alcohol from materials common in the United States is the ambition of Gilbert Dehnkamp, 16, of the Hinsdale, N. Y., Central High School, who submits a detailed scheme of the chemical process he has chosen.

Hugo Korn, 16, from Tuley High School, Chicago, Ill., has two ideas, one for a detector to be used in airplanes to spot factories in enemy country by infrared radiation, the other for an aerial camera which would be used in bad weather conditions.

*Science News Letter, July 18, 1942*

## PUBLIC HEALTH

# Smallpox Now at Lowest Ebb; Danger Seen in War Shifts

**A**N ALL-TIME low record for smallpox in the United States was set in 1941, but health authorities of the Metropolitan Life Insurance Company warn against overconfidence about the smallpox situation.

An increase in smallpox cases can confidently be predicted, they point out, if people generally get the false notion that vaccination against smallpox can be dispensed with. In that case the growing number of unprotected persons will provide a new fertile field for a resurgence of the disease.

The shift, because of the war, of thousands of families of war workers from smallpox areas to cities previously free of smallpox may lead to outbreaks in these cities. The best protection against this danger is a widespread and vigorous campaign for vaccination, including re-vaccination of adults.

Only 1,432 cases of smallpox were recorded for the entire country for the year 1941. Chief center for smallpox in the United States in past years has been in the northwestern corner of the country. Montana, Washington, Idaho, and



Oregon have generally been the states with the highest incidence, with the adjacent states having next highest rates.

Outstanding exception to the rule of low smallpox incidence in the rest of the country is Indiana. During the past

20 years this state has had about four times the number of smallpox cases recorded by all of the New England and Middle Atlantic States plus Delaware, Maryland and the District of Columbia.

*Science News Letter, July 18, 1942*

## CHEMISTRY

## Possible Rubber Substitutes From Soybean Oil Tested

**They Don't Have Quite So Much Stretch and Bounce As Real Rubber, But Will Serve Many of Its Purposes**

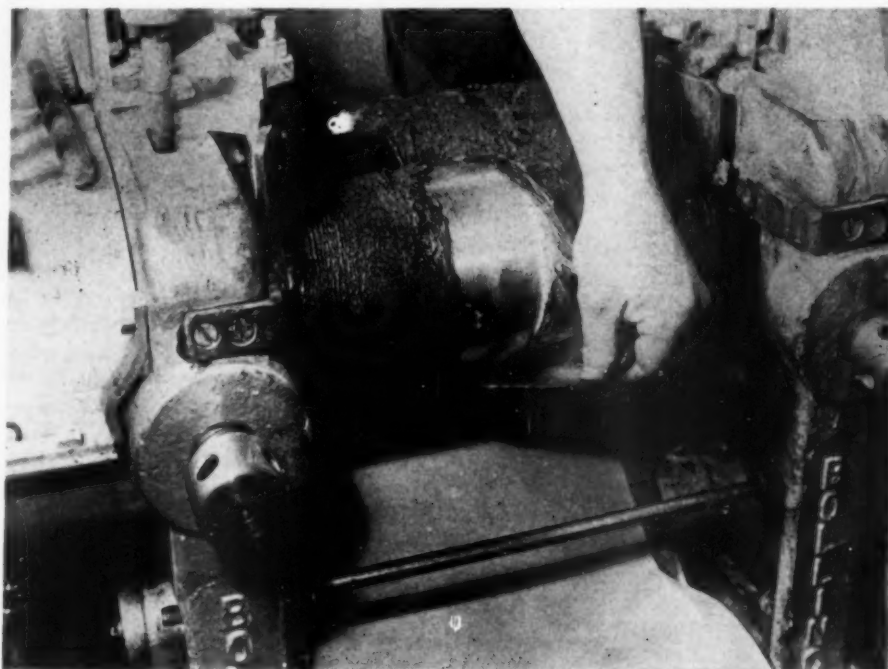
**R**UBBER-LIKE substances, with at least part of the stretch and bounce of real rubber, have been prepared from soybean and corn oils at the Northern Research Laboratory of the U. S. Department of Agriculture at Peoria, Ill. Some of these products will stretch 200% or more and return to original shape; they show tensile strengths of about 500 pounds per square inch. Natural rubber averages a 600% stretch, with a tensile strength of 3 000 pounds or more.

The substitutes are thus only approxi-

mations of real rubber in these respects. However, they may be able to do part of rubber's job in such things as water-proofing, resistance to abrasion and cracking, etc. In these ways they may be able to eke out the country's short supply of natural rubber.

Up to now, most of the research has been on laboratory scale only, but some of it has proceeded to the pilot-plant stage. If results there are still promising, the next step would be commercial trials.

*Science News Letter, July 18, 1942*



**IT STRETCHES**

*This is not rubber but it does have some stretch and bounce. It can be used for such purposes as water-proofing or resistance to abrasion and cracking. Great advantage is that it is made of soybean oil.*

## GEOLOGY

## Russia's Frozen Expanses Have Lessons for U. S.

**P**ERPETUALLY frozen ground covers 40% of the area of the Soviet Union. This is more area than the vast expanse of the whole United States. Alaska, just across the way from Siberia, has similar territory where the soil is icebound the whole year round. But Alaska has not been developed in these frigid regions to the same extent that Soviet scientists, engineers and developers have established colonies and industrial enterprises and mines on the frozen ground.

War brings added interest in the permanently frozen areas of the North American continent. The new defense highway from the U. S. A. through Canada to Alaska has to cross some such ground. Engineers at work on this project need all the information and help that can be given them. They need to know how to handle this ground that always has a fresh supply of ice and water in its depths. There are engineering tricks that can be used to keep houses and other structures from being damaged by the failure of the ground beneath. Often building upon such a foundation is worse than building on sand.

One of the Soviet's leading authorities upon frozen ground is the President of Leningrad University, Dr. K. I. Lukashev, a geologist who is deputy chairman of the Soviet Government Purchasing Commission in Washington. Although primarily engaged in getting American supplies to the Soviet's war effort, Geologist Lukashev has discussed mutual problems with American geologists. Russian technical literature, including an authoritative book by Dr. Lukashev himself, have been made available for American use.

For at least 300 feet, perhaps deeper, the soil is frozen in some places in both the American and Asiatic arctic regions. How long the ground has been frozen is not known, since in the more northern regions the ice age was continuous. The recurrent sweeps of great glaciers, by which geologists are able to do some dating in northern U. S. latitudes, are lacking. Geologic time is less important in wartime than immediate engineering problems. As geologists learn more about this icy area, there will undoubtedly be more accurate details about the happenings in the hundreds of thousands of years of recent geologic time, millennia before man came to the western world.

*Science News Letter, July 18, 1942*

## GEOLOGY

**Helium Production To Be Greatly Increased**

**H**ELIUM, only non-inflammable gas suitable for balloons, will be produced in greatly increased quantities to keep aloft more blimps for coastal submarine patrol, to inflate barrage balloons, for deep-sea diving and for medical and scientific uses, states Dr. R. R. Sayers, director of the U. S. Bureau of Mines. Congress has appropriated \$4,000,000 for this purpose which will be made available from Navy Department funds. Production will be stepped up to several times last year's figures.

Helium, element first found in the sun, is now obtained from Texas natural gas. For some years past, the Bureau of Mines plant at Amarillo has been the only helium plant in the world and has given the United States a world monopoly of the valuable gas. Now a new plant will be erected at an undisclosed location, and Bureau geologists are searching for other helium-producing fields.

*Science News Letter, July 18, 1942*

## DENTISTRY

**Synthetic Vitamin K May Be Tooth Decay Preventive**

**S**YNTHETIC vitamin K, taken in sugar candy or chewing gum, may be the means of preventing tooth decay, Dr. L. S. Fosdick, Dr. O. E. Fancher and Dr. J. C. Calandra, of Northwestern University Dental School suggest (*Science*, July 10).

Vitamin K, in both synthetic and natural forms, is known as the anti-bleeding vitamin and has in the few years since its discovery saved many lives threatened by hemorrhage.

Its anti-tooth-decay action depends on the fact that it prevents the formation of acid believed responsible for tooth decay.

In test-tube experiments a tiny amount (one milligram) of synthetic vitamin K in about three ounces of saliva and 10% sugar prevented acid formation for four hours. Measurements of the acidity of decayed spots on teeth in human mouths showed that the same concentration of synthetic vitamin K prevented acid formation, although, without the vitamin, the acidity of the decayed spots increased greatly in as little as three minutes.

The anti-carries action of the vitamin is not an antiseptic one, since synthetic vitamin K in the concentrations used in

these experiments will not stop the growth of bacteria. It acts by preventing formation of phosphoglyceric acid from the hexose phosphates and thus indirectly by preventing lactic acid formation.

*Science News Letter, July 18, 1942*

## BOTANY

**Stem Galls Provoked by "Bug Juice" Injection**

**S**TEM GALLS, tumor-like growths resulting from over-rapid multiplication of certain tissue cells, have been provoked in sugar-cane by injection with extracts of two kinds of insects, a leaf-hopper and a mealybug, J. P. Martin, pathologist of the Hawaiian Sugar Planters' Association, reports (*Science*, July 10). This is the first time that results of this kind have been obtained.

Mr. Martin made his extracts by mashing insects up in a mortar with a little distilled water. Small amounts of this "bug juice" were injected into the sugar-cane stalks with a hypodermic needle. The growths appeared first as blister-like excrescences, which rapidly became larger.

The injections also had the effect of causing more rapid growth of buds, and of branches springing from them. In some cases the chromosome numbers in the cells seemed to be increased. Further experiments on this point are now in progress. Mr. Martin suggests that insects may play an important part in the natural origin of plant varieties having multiple numbers of chromosomes.

*Science News Letter, July 18, 1942*

## MEDICINE

**Warn Against Cancer From Use of Sex Hormones**

**D**ANGER of breast cancer developing in women in middle life who are treated with female sex hormone preparations that are extremely powerful and have a prolonged effect is pointed out in an editorial in the *Journal, American Medical Association* (July 11).

The warning is based on experiments of Dr. Charles F. Geschickter and Dr. Elizabeth W. Byrnes, of Baltimore, which the editorial summarizes. These scientists report the occurrence of breast cancer in 202 of 555 white rats after female sex hormone treatment. The rats were members of a colony of more than 5,000 animals in which cancer had never before been observed.

*Science News Letter, July 18, 1942*

**IN SCIENCE**

## DENTISTRY

**Meeting of Dentists Postponed for Duration**

**T**HE 84th annual meeting of the American Dental Association, scheduled for August 24-28 in Boston, has been "postponed for the duration," Dr. Oren A. Oliver, of Nashville, Tenn., president of the association, announced.

The postponement was voted by the Association's board of trustees to avoid placing further burden on the nation's transportation facilities needed for the war effort. Some 10,000 dentists, many doubtless accompanied by wives and families, had been expected to attend the meeting. Boston hotels and business firms will lose an estimated \$1,000,000 from the postponement.

The house of delegates, standing committees and board of trustees will meet on the August dates in St. Louis to transact essential business of the association.

*Science News Letter, July 18, 1942*

## BIOLOGY

**Atlantic Seaweed Replaces Jap Agar**

**W**AR has given new value to two kinds of seaweed that grow along American coasts.

One is a giant kelp, from which products are derived that will at least partly replace the lost Japanese import source of agar. Agar is a kind of vegetable gelatin, used in bacteriological laboratory work, in medicine, and in certain industries. Research work of the U. S. Fish and Wildlife Service is still on an experimental basis.

The other seaweed use has long been a going affair. It is the collection of Irish moss or carrageen, a kind of red seaweed, used for purposes ranging from ice cream to medicine and shoe polish. It is collected mainly along the Massachusetts coast, especially in the neighborhood of Scituate. In 1939, all the Irish moss collected had a value of only \$24,000. Last year the crop was estimated as worth \$100,000.

*Science News Letter, July 18, 1942*



# THE FIELDS

## FORESTRY

## One Japanese Immigrant Is Praised by Forester

A DESIRABLE Japanese immigrant has received a highly laudatory writeup by E. W. Littlefield of the New York State Conservation Department (*Journal of Forestry*, July).

Said immigrant is a tree species, the black Japanese pine, known to foresters and botanists as *Pinus Thunbergii*. It is hardy and a sturdy grower, but its greatest virtue is its ability to withstand constant dampening with salt spray from the sea, which is highly discouraging or even fatal to all other pine species that have been tried along the Long Island coast. It will even stand occasional floodings from high storm tides. It is also resistant to several destructive insect pests.

*Science News Letter*, July 18, 1942

## POPULATION

## Men of Draft Age in America Have High Education Level

AMERICA'S draft Army is being selected from a population whose educational training is excellent. The number of American men between the ages of 18 and 25 who have completed less than four years' schooling is under 4%, according to recent Census figures. Of the white male population under 25, only about 2% fall in this lowest educational bracket; in northern and western sections of the country the figure is 1%.

Because the American people have misunderstood certain statistics, they have been led to believe that young men of draft age are "dumber" than they really are. Army deferments because of "literacy" requirements have given many people the false idea that there are millions of illiterate Americans of draft age, that is Americans unable to read and write, statisticians of the Metropolitan Life Insurance Company point out.

The Army has set its educational standards much higher than in the last war. Use of very complicated machinery and other equipment, on a large scale,

has made this more severe standard necessary. So far, 430,000 men have been deferred for Army service because of inability to meet the Army's educational requirements.

This basis for deferment has nothing to do with the 1940 Census classification of persons over age 25, with less than five years of schooling. There are 10,000,000 people in this classification. But a vast majority of these are in three special groups: immigrants who came into the United States before 1914, Negroes, and white persons from certain sections of the rural South.

Where complete illiteracy does exist, it is being wiped out rapidly. People over 25 who were frankly illiterate in 1940 comprise 3.7% of the population. In 1930 they represented 5.6%. Among Negroes the improvement is particularly conspicuous: 10.0% in 1940 as against 21.3% in 1930.

But even these figures do not represent the level of schooling of children today. They reflect, rather, the educational systems of a generation ago. The 1940 Census figures show that, of children at ages 10 to 13, 95.5% are in school. In most places in the United States the figure is as close to 100% as it can be. Children not in school today are often, for physical or mental reasons, uneducable.

*Science News Letter*, July 18, 1942

## GENERAL SCIENCE

## Need of Scientists Brings Let-Down in Requirements

THE Government's urgent need for scientifically trained men and women, particularly for physicists, metallurgists and chemists, has brought about a let-down in the requirements, the Civil Service Commission has announced.

College teaching, and in the case of physics, high school, preparatory school and trade school teaching, may now be offered as professional experience. There is no maximum age limit, no "recency" clause with respect to education or experience, no deadline set for applying for the positions. However, persons qualified are urged to apply at once. There is excellent opportunity for women physicists and chemists, the announcement stated.

The requirements now are, for the \$2,600 grade, a four-year college course leading to a bachelor's degree, plus two years of professional experience. Additional experience is required for the higher grades.

*Science News Letter*, July 18, 1942

## SEISMOLOGY

## July Began with Family of Nine Quakes

A WHOLE "family" of earthquakes, nine all told, were recorded as occurring near the coast of Ecuador during the first four days of July, U. S. Coast and Geodetic Survey seismologists stated after a study of records collected telegraphically by Science Service. There were two shocks on July 1, two on the second, three on the third, and two on the fourth.

The epicenter was located almost on the equator, in latitude one degree south, longitude 81 degrees west. Time of origin of the strongest shock was 8:53 p.m., EWT, on Friday, July 3.

Stations reporting were those of the Jesuit Seismological Association at Fordham University and St. Louis University, and of the U. S. Coast and Geodetic Survey at Tucson, Ariz., and San Juan, P. R.

*Science News Letter*, July 18, 1942

## ZOOLOGY

## Heat Called Cause of Wavy Fur in Muskrats

HEAT seems to be the secret of "permanent waves" in muskrat fur, as it is in the hair of the females of the human species. At least, this is the suggestion of E. A. McIlhenny, manufacturer and enthusiastic naturalist.

A short time ago notices appeared of the discovery of two muskrats in Maryland marshes, with their fur in beautiful undulations like permanent waves (*SNL*, March 7, p. 147). At the time, it was conjectured that the condition might be hereditary, and it was taken as a great rarity.

However, Mr. McIlhenny writes that "in the many thousands of muskrats produced on my muskrat farm, I annually get a number of animals that show the fur permanently waved. . . . Trappers and I consider this rippled fur due to rats having been scorched by fire. A number of the skins having wavy fur, which I have examined, showed some scorching of the ears and tail.

"It is customary to burn the marshes off before trapping begins, or during trapping. Animals over which the fire may pass in dry seasons frequently get the fur burned off their backs, and when it re-grows it is always patterned or waved, often interspersed with tufts of white."

*Science News Letter*, July 18, 1942

ENTOMOLOGY—MEDICINE

## Warns of Danger of Poisoning By the Puss Caterpillar

**W**ARNING against the danger of poisoning by the puss caterpillar appears in a report by Dr. Thomas L. Lucas, Walter Reed General Hospital, Washington, D. C. (*Journal, American Medical Association*, July 11).

Poisoning, serious but not fatal, of a man who had a caterpillar drop on his neck while walking through a southern Maryland cornfield first brought the danger to Dr. Lucas' attention. Severe itching with "wheals" ranging in size from a dime to a silver dollar was followed within ten minutes by burning pain, severe muscle cramps on the side of the neck and shoulder near the poisoned spot, and severe headache. An opiate (codeine) was required for relief of the pain. The skin blistered and peeled and healed "much as a first degree

burn would be expected to heal," taking about ten days to heal completely.

Similar symptoms including nervousness, restlessness and rapid pulse rate occurred in several other cases which Dr. Lucas found had been reported in medical literature. Local treatment of the caterpillar "bite" is ineffectual, and the patient must be given an opiate or other drug with systemic effect.

Dr. Lucas believes cases occur frequently but are not reported either because the patient does not see a physician or because the caterpillar is not recognized as the cause of the poisoning symptoms.

The puss caterpillar, known technically as *Megalopyge opercularis*, is a short, bushy variety which seems to rear up on its hind legs and "make a face" at any-

one coming near it. It has straight, sharply pointed, hollow spines which can prick the skin of anyone touching it, thus letting the poison into the body. The exact toxic principle involved needs to be determined, Dr. Lucas points out.

Puss caterpillars are widely distributed in the Southeastern states and may be spreading to neighboring areas. They may be found on oak, elm, plum and sycamore trees, in flower and truck gardens, in orchards and on corn.

*Science News Letter, July 18, 1942*

ENGINEERING

## Wood Pipes Carry Water For War Industry Plants

**W**OOD PIPE is recommended for use in cantonments and new war industry plants and their housing areas, to release steel urgently needed elsewhere, by Robert Turner in the current issue of the *Military Engineer* (June). Wood pipe, he says, has a number of real advantages of its own. It can be laid rapidly, does not rust or corrode, and its natural tendency to swell when wet makes it automatically tighten its own joints, doing away with need for calking.

Despite widespread belief that wood buried under ground decays rapidly, wood pipe kept well filled with water lasts indefinitely, Mr. Turner declares. Decay organisms and burrowing insects do not like water-soaked wood. A number of cities in the timbered areas of the West have used wood pipe in city mains for several decades; and when the first wooden water pipes laid in New Orleans, in 1793, were dug up after being in service for more than 200 years, they were found to be in good condition.

Several types of wood pipe are in use. The most common forms are stave-constructed, and strengthened with steel hoops or spiral wire wrappings. However, one large manufacturing concern has produced an emergency wood pipe that uses no critical materials at all. It is practically all-wood in its makeup.

Even newer is a recently patented kind of plywood tubing, the invention of Cyril Farny of St. Charles, Ill. In this, strips of thin plywood are wound spirally over a form and subjected to pressure and heat. The form is then slipped out of one end. Alternate strips, as many as desired, are wound over each other, each strip winding in a direction opposite to that of its neighbors, and all cemented together with a plastic glue.

*Science News Letter, July 18, 1942*



HANDY

This novel sulfa drug "shaker" is one of the latest U. S. Army weapons against infection of wounds. It is a newly developed method of sprinkling the curative powder upon a wound safely and quickly. Sulfanilamide, like everything else that touches a wound, must be sterilized. The army surgeon in the field may not have the equipment to do this. Hence the substance already sterilized is put up in little cellophane and paper packages, just enough in each for one application.

## MEDICINE

# Buffers in Wine Make It Slower To Cause Drunkenness

**Substances Tend To Neutralize Acids and Alkalis;  
Taking Whisky With Soda Water Does Not Help, Though**

**R**EASON why whisky or other hard liquor makes a man drunk faster than wine is because the wine contains buffers, substances that tend to neutralize acids and alkalis, according to experiments reported by Dr. Henry Newman and Dr. Mason Abramson, of Stanford University School of Medicine (*Science*, July 10).

The buffers in wine, they report, slow down its absorption and consequently the time it takes for its alcohol to get into the blood.

Taking whisky with soda water or other carbonated beverages would not, however, slow its absorption by neutralizing stomach acidity, as many persons believe, because carbonated beverages are all acid themselves. The Stanford experimenters do not state whether the buffer action of the wines was in the direction of neutralizing acidity or alkalinity.

The experiments were made by measuring the alcohol in the blood of two persons after drinking alcohol, Scotch and Bourbon whiskies, gin and California Port and Burgundy wines. Enough

of each was taken so that the concentration of alcohol in each drink was 13% by volume. The drinks were taken in 10 minutes on an empty stomach.

Maximum concentration of alcohol in the blood of test drinker A was reached in 45 minutes for Scotch, gin, alcohol and Bourbon. Maximum concentration time after Burgundy was an hour and a half, after Port two hours, showing that the wine was absorbed two to three times more slowly.

Test drinker B showed no such difference in absorption of alcohol because his distinct aversion to the distilled liquors, resulting in mild nausea, disturbed his stomach so much that it interfered with the rapid absorption of these liquors. X-ray examination showed that normally there was no difference in stomach motility of the two subjects.

As further evidence that the buffers in the wine are responsible for its slower absorption into the blood, the scientists report that when straight alcohol was buffered to the same degree as the Port wine, it was absorbed at practically the same rate as the wine.

*Science News Letter, July 18, 1942*

## PUBLIC HEALTH

# Anti-Venereal Disease Program Is Intensified

**A**DDITIONAL measures to protect American troops against venereal disease to meet the change to a war-time status were disclosed by the War Department.

Specially qualified Medical Corps officers will carry out these measures. Supplementing the present program, a venereal disease control officer with the grade of major will be assigned to each Army camp of 20,000 or more men, each Field Army, Air Force, and Armored Force, each Corps Area or Department, General Headquarters and Headquarters, Communications Zone.

Control measures to be taken within the military commands include:

1. Supervision, coordination and improvement of the venereal disease educational program.
2. Cooperation with other military agencies in order to provide an adequate recreational program.
3. Cooperation in the provision and maintenance of adequate facilities for prophylaxis.
4. The provision of adequate physical inspections of troops to detect early such cases as may fail to report at sick call.
5. The provision, standardization and

## RADIO

Saturday, July 25, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Lt. Col. L. B. Lent, chief engineer of the National Inventors Council, will discuss inventions.

Tuesday, July 21, 7:30 p.m., EWT

Science Clubs of America programs over WHUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

Isabel Hoopes, of the New England Museum of Natural History, will talk about "Methods of Defense Among Reptiles."

One in a series of regular periods over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.

supervision of facilities for the diagnosis and treatment of military personnel.

6. Close cooperation with local civilian health authorities to insure the reporting of probable civilian sources of infection which occur among soldiers in order to assist the civilian agencies in the elimination of foci of infection.

7. The collection and detailed analysis of data concerning the incidence and sources of infections acquired in the troops of the respective organizations.

In the civilian communities the control officers will cooperate with all agencies concerned.

*Science News Letter, July 18, 1942*

## AERONAUTICS

## World's Largest Propeller Is Put Through Its Paces

See Front Cover

**T**HE ILLUSTRATION on the front cover of this week's SCIENCE NEWS LETTER shows the new Curtiss-Wright 18-foot airplane propeller, largest in the world, undergoing tests. This propeller is larger than those of the new U. S. Army's 82-ton bomber, world's largest land plane, or those of the Navy's giant "Mars," world's largest flying boat. No Axis propeller approaches this size, so far as known. The blades are of hollow steel designed especially for high altitude flying.

*Science News Letter, July 18, 1942*

**Languages Made easy By Linguaphone**

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RESOURCES

# Glycerin for Explosives Will Come From Salvaged Drippings

Other Breakdown Products Are Fatty Acids, of Use Principally in the Soap Industry; May Be Spoiled

**S**CRAP FATS, that are to be detoured from the nation's garbage cans into our war industries, will aid materially and directly in cooking Hitler's goose. These greasy drippings have immediate military value, for they will yield vast quantities of glycerin, and glycerin treated with nitric and sulfuric acids becomes nitroglycerin.

Nitroglycerin as such is not used in warfare, but as dynamite and other blasting preparations it is one of the principal tools of the Engineer Corps. The "shovel-soldiers" use it in clearing roads for troops and tanks and guns and trucks hustling up to the front. They use it also in demolitions, to prevent an advancing enemy from taking advantage of bridges, docks, warehouses and other installations.

Too violent to trust in a gun, nitroglycerin is mixed with some types of smokeless powder "dough" to pep up the final product.

Back of the firing line, nitroglycerin blasting preparations are needed now in unprecedented quantities for getting out ores and coal for the war industries, for quarrying limestone to feed into blast furnaces, for clearing new airfields, factory sites, etc.

It won't matter if the fats saved from kitchens and hamburger joints get old and smelly before they are turned in. That merely means that the natural process of breaking down into glycerin and their other constituents, the fatty acids, has been going on. And fats have to be

thus chemically split apart before they are industrially useful.

The other breakdown products of fats, the fatty acids, are of use principally in the soap industry. As glycerin plus acids becomes explosive nitroglycerin, fatty acids plus alkalis become cleansing soap. No matter how strong and rank a soap-vat may seem at the beginning of the job, such is the nature of the soap-making process, and such the skill of soap-makers, that the end-product has a wholesome, nose-appealing odor. Add a little perfume, a French name, and a little advertising, and nobody ever asks about the wrong-side-of-the-tracks antecedents of this offspring of chemically divorced-and-remarried fat.

RESOURCES

# Glass That Floats Breaks Life Preserver Bottle-Neck

**B**REAKING a bottle-neck caused by the shortage of cork, a new kind of glass that floats on water is about to be used in life preservers, life rafts and life boats of America's war effort.

It is a black, non-transparent material that does not at all look like ordinary glass. Weighing only 10 pounds per cubic foot, Foamglas, as it has been named, is being produced in a large factory in western Pennsylvania by the Pittsburgh Corning Corporation.

The new floating glass has a cellular structure but each tiny cell is airtight. For that reason the material is permanently buoyant in water and has high insulating value. It is rigid rather than resilient, and can be sawed or drilled with ordinary tools.

It is expected to serve in place of such scarce imported materials as balsa wood, cellular rubber and kapok as well as cork. Foamglas has the added advantages of being odorless, fireproof and vermin-proof.

The light-weight glass is made by

However, by no means all the soap that is made gets into the domestic bathroom and laundry. Whole shiploads of soaps, of various special types, are tailor-made for industrial use. Fabrics, leather, glassware, a thousand other things, all get their sudsy baths before they appear on the market.

The scrap-fat drive, just announced, is intended to get replacements for the glycerin and soap-acid sources cut off by the war. We used to depend on coconut oil imports from the Philippines and other Pacific islands for most of our glycerin-and-soap requirements. Added to this, in smaller but still impressive quantities, were such oils as olive oil from the Mediterranean region, soybean oil from eastern Asia and linseed oil from Russia and Argentina. Enemy conquest has robbed us of some of these sources, shortage of shipping reduced supplies from others. We are greatly increasing our domestic production of plant oils, especially soybean, peanut, flax, corn and cotton. But we need still more raw materials for explosives and soap, hence the newly announced fat-saving drive.

*Science News Letter, July 18, 1942*

## For Sale

Out-of-print scientific publications of the U. S. Government—Smithsonian Institution, Geological Survey, National Museum and others. Large stock. Send want list.

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a process that resembles the way in which yeast or baking powder raises bread. Ordinary glass is mixed with a small quantity of pure carbon. When the glass is heated to a certain point it softens and the carbon combines to form a gas that puffs up the molten mass to one-fifteenth the weight of ordinary glass. Exact time and temperature control is necessary to obtain rigid vitreous slabs with cells uniformly small and sealed one from another.

Since 1938 this new product has been under development in the research laboratories of Pittsburgh Corning Corporation, jointly owned by Pittsburgh Plate Glass Corporation and Corning Glass Works.

In addition to going to sea as the buoyant element in life-saving apparatus, the new glass is to be marketed as insulation in the cold rooms of meat-packing plants, breweries, dairies and ice cream plants. It will also be used in floats that support pontoon bridges.

*Science News Letter, July 18, 1942*



Weeds and Sneezes

**R**AGWEEDS are getting well into bloom now, in the southern part of their range, and within a week or two at most they will be going full blast all the way up to the Canadian boundary. Full blast, too, will be the reëchoing chorus of sneezes from millions of afflicted hayfever victims. As the clouds of pollen rise, showers of unwilling tears descend from reddened, smarting eyes.

Quite a number of plant species shed hayfever-causing pollen, especially during the early hayfever season, before the ragweeds open hostilities: grasses (whence the malady's name), narrow-leaved plantain, several kinds of trees, especially oaks. But all these are as nothing to the two species of ragweed responsible for at least 90% of all hayfever cases in the United States. There are other late-summer hayfever weeds, too: marsh elder, cocklebur, one or two minor ragweed species. But these are only secondary nuisances. Ragweeds, tall and low, are the real villains of the piece.

Tall ragweed, botanically *Ambrosia trifida*, fits its name so far as height is concerned, for it rears its coarse, rough-skinned stalk to as much as 12 or 14 feet, with an abundance of equally rough, broadly three-lobed leaves — whence the specific name *trifida*.

Low ragweed is low only by comparison with its tall relative, for while it ordinarily grows about knee-high or a little more, it can, as a cornfield weed on rich soil, easily become waist-high, even shoulder-high. Its botanical name is *Ambrosia artemisiifolia*. That formidable-looking specific name is in reference to its leaves, which are finely subdivided like the leaves of sagebrush; the generic

name of sagebrush is *Artemisia*. (Where the ragweeds got their much-too-complimentary name of *Ambrosia* is difficult to guess.)

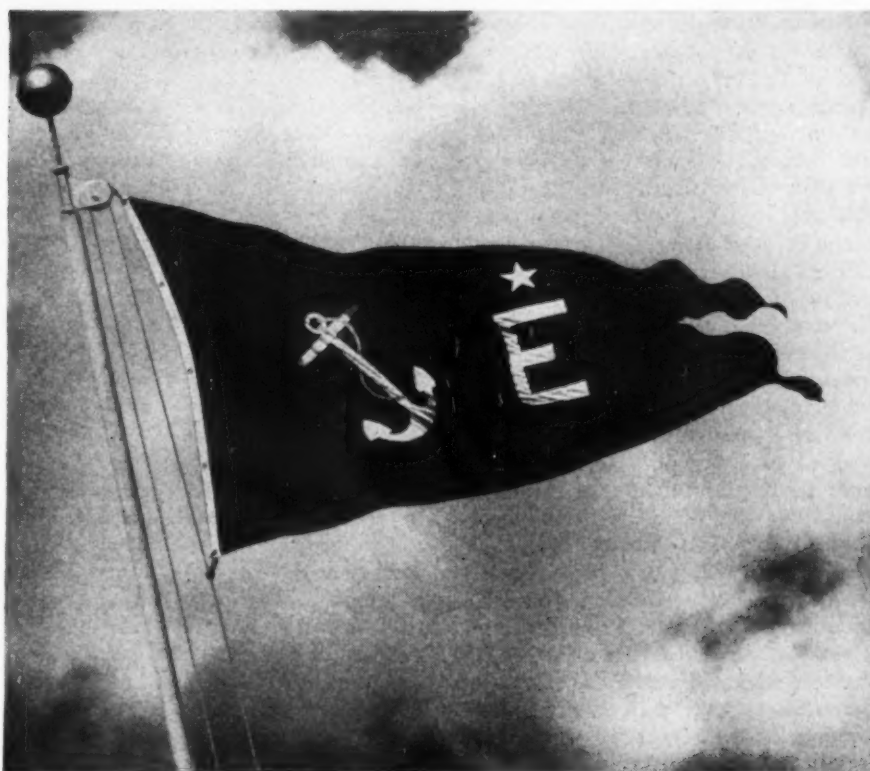
Both species like good soil. That is why low ragweed infests cornfields and tall ragweed stands in dense thickets on the alluvial floodplains of prairie creeks and rivers. Foliage of both is distinctly unappetizing to livestock; low ragweed grows thick in overgrazed pastures, but is never eaten.

Flowers of both species are much alike. The female and male blossoms

are borne separately. The former are inconspicuous little nubbins hidden among the leaves, and don't count in the hayfever story. The male flowers, which also lack any trace of ornamental petals or sepals, are clustered on branching spikes at the ends of the branches. They are just pollen factories. And are they efficient for evil!

*Science News Letter, July 18, 1942*

Luminous labels for bottles used in photographic dark-rooms are a new time saver.



## A New Star over America

**T**HIS is the new All-Navy "E" burgee. With its added star, it signifies that, for a period of over six months, production of Navy material has been apace of schedule. First flown in America over the Bausch & Lomb plant, it is official Navy recognition to B&L workers of their continued achievement in Production for Victory. It replaces the Bureau of Ordnance flag and "E" pennant awarded Bausch & Lomb July 25, 1941.

The Navy "E" has always been an honor to be striven for, to be guarded jealously. On gun turret, battleship funnel, or the flag-staff of an industrial plant, it is a symbol of championship performance. But today, Navy officials—and the American public—

are anxious to see this award in as many places as possible. Because "championship performance" is what America needs today—all down the line.

Workmen at Bausch & Lomb are devoting to the specific implements of war, the experience and skills gained in the production of scientific optical instruments. Today the world depends on America's men-behind-the-men-behind-the-guns to destroy the forces of aggression—that the ideals of individual freedom may survive.

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## PHYSICS

# Atomic Fission Takes Place In Sun's Corona, Is Theory

Would Account for Mysterious "Forbidden" Lines in Spectrum of the Corona Due to Stripped Atoms

ATOMIC fission similar to that of uranium 235, on which hopes of atomic power on this earth are based, takes place in the sun's corona, that system of luminous streamers that surrounds the sun and is visible only at a total solar eclipse.

This is the theory proposed by the eminent Indian scientist, M. N. Saha, University College of Science, Calcutta, in a letter to the British scientific journal, *Nature* (May 9).

The cracked atoms, stripped of many of their outer electrons, originate, according to the theory, in the layers below the corona and are hurled outward with terrific velocities. As they travel they knock off electrons right and left from the atoms they encounter, themselves alternately gaining or losing an electron as often as a thousand times in a distance of one centimeter (about 0.4 of an inch). Loss of energy through the frequent collisions finally brings the streaking fragments to a halt.

This theory accounts for a number of things hitherto obscure. The outer corona is generally believed to consist entirely of free electrons. But the origin of these electrons was never until now adequately accounted for. Mysterious "forbidden" lines have been observed in the spectrum of the corona. Many of these lines were found to be due to atoms of iron, nickel and calcium that had been stripped of many of their outer electrons. This discovery of Grotrian and Edlen, which Dr. Saha confirmed, was thought to com-

plicate the theory of the solar corona. But it fits right into Dr. Saha's theory.

His idea is that these atoms are the result of a cracking process like the fissions of uranium, thorium and protactinium, which have been carried out on the earth. The idea is supported by recent experiments at Prof. Bohr's laboratory at Copenhagen by Boeggild, Lauritsen and others. The experimenters found that fission fragments are hurled apart

with velocities of about 9,000 miles per second,  $1/20$  that of light, which are greater than the velocities of the outer electrons in their orbits. Consequently these electrons are left behind and the fission fragments become highly stripped atoms. It is as though the sun should be suddenly whisked away, leaving its planets behind.

The forbidden lines observed in the sun's corona, forbidden because they do not occur under ordinary earthly conditions, are broad. This broadness indicates a velocity of about 60 kilometers (36 miles) per second. This is the velocity, Dr. Saha says, which they have slowed down to by the time they get far enough out into the corona for their lines to be observed. Everything thus seems to jibe with observations in Dr. Saha's theory of the solar corona.

*Science News Letter, July 18, 1942*

## CHEMISTRY

## 2,682 Ships Would Be Needed To Bring In 5 Products

JUST five of the many vital war products now being produced synthetically in this country would require 2,682 good-sized cargo ships to bring a year's supply from overseas. They would form a bridge of ships across the Atlantic spaced a trifle over a mile apart. This is an estimate made by E. I. du Pont de Nemours & Company.

The five products are nitrates for explosives and fertilizers, rubber, dyestuffs, textile fibers, and camphor for medicinal use and manufacture of many essential chemicals.

Of these five, only nitrates would still be obtainable if the ships could be spared. Chile was formerly our chief source. Now we are making nitrates from nitrogen

drawn from the air. The other four products came from countries now in enemy hands.

Ninety-five per cent of our rubber came from countries now dominated by Japan. Most of our dyestuffs formerly came from Germany. Silk came from Japan, and most of our camphor came from the Japanese island of Formosa.

The synthetic production of these products in our own country with our own materials will not only help to win the war, but make us independent of foreign world-wide monopolies after the war.

*Science News Letter, July 18, 1942*

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## New Machines And Gadgets

### Novel Things for Wartime Living

A muzzle for the ferocious rooster that pecks others of its species and sometimes kills them is provided by an invention recently patented. It is a simple device consisting of a single piece of wire something like a paper clip. This is threaded through the nostrils of the bird and folded around under the upper beak, thereby preventing the fowl from entirely closing the beak. According to the claims of the inventor, the muzzle prevents the barnyard bully from fighting, picking and pulling the feathers of other birds but does not interfere with breathing, eating and drinking.

Concrete floors can at last be painted with a paint that does not peel or wear off. The new product is essentially a dye which penetrates below the surface and retains its color as the concrete wears down.

You can shatterproof your own windows by painting on the inside a newly developed transparent coating which forms an elastic film and prevents flying splinters. The coating dries in an hour and can be removed when no longer wanted with a razor blade. In case you wish to blackout at the same time, a black opaque coating of similar nature is offered. It will last for a year and can be washed off with water.

Water is being poured into gasoline in the illustration, and the water is running right through the tube and out at the bottom, leaving the gasoline behind. This surprising result is obtained by a float, indicated by an arrow, which sinks in gasoline and floats in water. Water, being heavier than gasoline, lifts the float and runs out through the hole at the bottom. When all the water is gone, the float sinks and stops the



hole. This principle is applied in a device to separate water from gasoline as it is being pumped into an airplane, thus assuring the aviator gasoline free of water. The device is the invention of an army sergeant but is not as yet available to the public.

For filtering water in army or construction camps, or in summer camps, where water pressure is not available, a filter and hand pump are provided which can be carried on the back in a knapsack. The entire filter including pump and hose weighs 19½ pounds. It can filter two gallons per minute and one cartridge is good for from 100 to 500 gallons according to the condition of the water.

*If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 113.*

*Science News Letter, July 18, 1942*

## Some ferns made fossils some ferns made

# COAL

THIS UNIT OF "THINGS of science" contains a specimen of a fossil fern leaf from the Coal Age, 250,000,000 years ago. Flowers as we know them evolved millions of years later. The era was so early that shallow seas from time to time washed over great tropical forests extending from the Arctic to Antarctica.

Many ferns and other plant forms were compressed into layers of coal, but the fern fossil was formed in the mud or silt of a river delta in that prehistoric time.

Out of this Coal Age came not only this fern fossil, but the source of the industrial productivity of the United States. Our country has half of the known coal supplies of the entire world. Coal makes possible not only fuel, but steel, nylon, sulfa drugs, TNT and many another useful product.

As in all units of THINGS of science, this unit contains a specimen of scientific material to be examined, studied, and enjoyed. A museum-style legend card is supplied; a brief, clear explanation is included. This service is under the sponsorship of Science Service, the non-profit institution for the distribution of scientific information.

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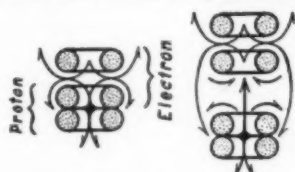
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Th-5

## ESSAYS ON THE NEW VORTEX ATOM



Neutron and Hydrogen Atom. Copyright 1937  
by Carl F. Krafft.

The existence of two neutral particles of atomic weight 1 but with totally different properties is just one of the many things which the nuclear theory cannot explain. Free upon request.

C. F. Krafft, 1322 Amherst Ave., Richmond, Va.

### ENGINEERING

## Transparent Plastics Bring Safety to Workers

TRANSPARENT sheets of plastic are used to guard workers at dangerous production machinery from flying sparks, molten and solid metal whirled into the air. In some cases safety goggles on the machine operators have been replaced by housings of cellulose acetate sheets around the machine. This method of protection is not only more comfortable and safer, but need not be renewed so frequently.

*Science News Letter, July 18, 1942*

# •First Glances at New Books

## NAVIGATION

**MANUAL OF CELESTIAL NAVIGATION**—Arthur A. Agaton—*Van Nostrand*, 103 p., \$1.85. Short cuts in navigation and tables from which solutions can be obtained at one opening of the book without interpolations. By the head of the Navigation Division of the U. S. Naval Academy.

*Science News Letter, July 18, 1942*

## CONSERVATION

**CONSERVATION OF NATIONAL RESOURCES, An Educational Approach to the Problem**—George T. Renner—*Wiley*, 228 p., illus., \$2.75. A textbook for classes in conservation. If the teachers of tomorrow make themselves thorough masters of the facts and doctrines here set forth, we can look for results from the citizens of day after tomorrow.

*Science News Letter, July 18, 1942*

## NATIONAL DEFENSE

**WHAT THE CITIZEN SHOULD KNOW ABOUT CIVILIAN DEFENSE**—Walter D. Binger and Hilton H. Railey—*Norton*, 183 p., illus., \$2.50. The greater part of the book is devoted to explanations of bombs and what to do about them.

*Science News Letter, July 18, 1942*

## HISTORY

**ORIGIN OF THE FAR EASTERN CIVILIZATIONS: A Brief Handbook**—Carl Whiting Bishop—*Smithsonian Institution*, 53 p., illus. Free upon direct request from Smithsonian Institution, Washington, D. C. (War Background Studies, No. One). First of a series that promises to give notable help in understanding the history now in the making with so much rapidity and intensity.

*Science News Letter, July 18, 1942*

## GEOGRAPHY

**THE FACE OF SOUTH AMERICA, An Aerial Traverse**—John Lyon Rich—*American Geographical Society*, 299 p., illus., \$4. A book full of magnificent airplane pictures of our neighbor continent, with good descriptive text arranged in the form of a flight log.

*Science News Letter, July 18, 1942*

## LIBRARY SCIENCE

**UNITED STATES GOVERNMENT PERIODIC PUBLICATIONS, A Descriptive List**—Special Libraries Association, Washington, D. C. Chapter—*Special Libraries Assn.*, 87 p., \$2. One of the valuable features of this list is the "Keep" and "Discard" note for each item, showing whether the

material is later published in more permanent form elsewhere. Librarians who furnished this list during the wartime press of work in Washington deserve much credit.

*Science News Letter, July 18, 1942*

## LIBRARY SCIENCE

**A. L. A. RULES FOR FILING CATALOG CARDS**—Prepared by a Special Committee, Sophie K. Hiss, Chairman—*American Library Association*, 109 p., \$2. Only a librarian can realize how useful this book will be in the nation's libraries. It answers the many tedious questions which arise in filing cards, and can be turned over to assistants as a source of information.

*Science News Letter, July 18, 1942*

## ZOOLOGY

**CATALOG OF THE TYPE SPECIMENS OF MAMMALS IN THE UNITED STATES NATIONAL MUSEUM, INCLUDING THE BIOLOGICAL SURVEYS COLLECTION**—Arthur J. Poole and Viola S. Schantz—*Govt. Print. Off.*, 704 p., \$1.25. (U. S. Natl. Museum Bull. 178). A technical publication intended for only a limited audience, but of extremely great usefulness to them.

*Science News Letter, July 18, 1942*

## ● Just Off the Press ●

**ABSTRACTS OF ARTICLES AND PATENTS ON THE PRODUCTION OF GLYCEROL BY FERMENTATION**—Muriel E. Whalley—*National Research Council of Canada*, 66 p., 50c.

**AMERICAN BUTTERFLIES AND MOTHS**—Cecile Hulse Matsch; Illus. by Rudolf Freund—*Random House*, 70 p., illus., \$1.

**DO YOU WANT TO BE A NURSE?**—Dorothy Sutherland—*Doubleday, Doran*, 186 p., \$2.

**EXTRACTION OF RUBBER FROM PLANTS**—Muriel E. Whalley—*National Research Council of Canada*, 19 p., 25c.

**MAGNETIC TOOLS AND APPLIANCES IN ENGINEERING PRODUCTION**—E. Molloy, ed.—*Chemical Pub. Co.*, 16 p., illus., \$2.50.

**MATHEMATICS IN HUMAN AFFAIRS**—Franklin Wesley Kokomo—*Prentice-Hall*, 754 p., Trade, \$5.35; School, \$4.

**PHOTO GUIDE**—*Popular Mechanics Co.*, 188 p., illus., 50c.

**PLASTICS**—J. H. DuBois—*Amer. Technical Soc.*, 295 p., illus., \$3.

**POPULAR MECHANICS GARDEN BOOK**—*Popular Mechanics Co.*, 96 p., illus., \$1.

**SEISMOLOGY**—Perry Byerly—*Prentice-Hall*, 256 p., illus., Trade, \$4.65, School, \$3.50.

**A SYMPOSIUM ON RESPIRATORY ENZYMES**—*Univ. of Wisconsin Press*, 281 p., \$3.

**TRIGONOMETRY, PLANE AND SPHERICAL**—Miles C. Hartley—*Odyssey Press*, 24 p., \$1.60.

**WAR GASES, Their Identification and Decontamination**—Morris B. Jacobs—*Interscience Publishers*, 180 p., \$3.

## ENGINEERING

**YOUR CAR IS MADE TO LAST**—Herman Bishop and Bergen Evans—*G. P. Putnam*, 186 p., \$1.50. A timely tome which tells you how to get 100,000 miles out of your car, how to save rubber and gas, and how everything works, written by an experienced garage man and trouble shooter with the help of a university professor.

*Science News Letter, July 18, 1942*

## BIOLOGY

**TEMPERATURE AND EVOLUTION, ISOLATING MECHANISMS, GENETIC CONTROL OF EMBRYONIC DEVELOPMENT**—Th. Dobzhansky, ed.—*Jaques Cattell Press*, 355 p., \$3.50. (Biological Symposia, Vol. VI). One of a really notable series of symposia in biology. It will of course appeal mainly to professional readers.

*Science News Letter, July 18, 1942*

## AGRICULTURE

**THE FARM PRIMER, A Manual for the Beginner and Part-Time Farmer**—Walter Magnes Teller—*McKay*, 266 p., \$2.50. A book that can be used to advantage in rural high school classes or as a manual for adults undertaking to get part of their living out of a small piece of land.

*Science News Letter, July 18, 1942*

## HORTICULTURE

**FOOD GARDENS FOR DEFENSE**—M. G. Kains—*Greenberg*, 246 p., illus., \$2. A new gardening book, that tells not only how to grow vegetables but tree and small fruits, also how to combat weeds and insects and to get the most good out of fertilizers. There are a number of useful appendices, too.

*Science News Letter, July 18, 1942*

## PSYCHOLOGY

**THE CREATIVE UNCONSCIOUS, Studies in the Psychoanalysis of Art**—Hanns Sachs—*Sci-Art Publishers*, 240 p., \$2.75. Some observations by a psychoanalyst on artistic creativity.

*Science News Letter, July 18, 1942*

## GENERAL SCIENCE

**AMERICAN FOUNDATIONS AND THEIR FIELDS (5th ed.)**—Geneva Seybold, comp.—*Raymond Rich Associates*, 274 p., table, \$5. This book lists basic data on 314 foundations, including 95 reported on for the first time. Funds, investments and grants are listed, and the volume is well indexed.

*Science News Letter, July 18, 1942*